REMARKS

Claims 1 and 8 have been amended for clarity. Claims 1-15 are pending in the application. No new matter has been added.

Claims 1 and 8 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In particular, the Examiner stated that "In both claims, "estimating the etch endpoint", and detecting based on the "estimated etch endpoint" is vague and indefinite, as an "estimated" value is a subjective measure. To expedite prosecution, Applicants have amended claims 1 and 8 to change "estimating" and "approximating" to "selecting." In addition, the preamble of claim 8 has been amended to change "a layer having an approximate initial thickness" to recite "a layer having an initial thickness." Accordingly, the Applicants respectfully submit claims 1 and 8 to be patentable and request withdrawal of this rejection.

Claims 1-14 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,499,733 to Litvak in view of U.S. Patent No. 5,780,315 to Chao et al. (Chao). As will be fully explained below, the combination of the Litvak and Chao references does not establish a *prima facie* case of obviousness against the subject matter defined in claims 1-14, either as originally filed or as amended herein for purposes of clarification.

As stated in Applicants' previous response, one of the most evident examples that the claimed invention is not, in fact, obvious relates to the elements of "detecting a last intensity maximum reflected at a first wavelength prior to the selected etch endpoint,"

and "detecting an intensity maximum reflected at a second wavelength first occurring after the last intensity maximum at the first wavelength," as recited in independent claims 1 and 8.

Neither the Litvak reference nor the Chao reference discloses these elements. The simple assertion that it would have been obvious to "modify Litvak by detecting intensity maximums, as per Chao" is not what is claimed. What is claimed are specific combinations involving detecting an intensity maximum in a first wavelength and detecting an intensity maximum in a second wavelength that occurs after the last intensity maximum at the first wavelength. In this manner, endpoint detection is greatly enhanced, as the last intensity maximum in the first wavelength is used to approximate the endpoint, and the following intensity in the second wavelength refines the endpoint detection. Since the endpoint occurs after the detection of the intensity maximum in a second wavelength, by choosing a sufficiently short second wavelength, the etch endpoint will be extremely close to the underlying layer.

Litvak discloses exposing the wafer surface to a single wavelength light source and determining an endpoint when the reflected maximum and minimum signal oscillations stop and the reflected signal remains constant. (Litvak, col. 8, lines 18-20). There is simply no reference to detecting the reflected maximum of a first signal and the reflected maximum of a second signal and using the combination of the two signals to determine the endpoint, as required by independent claims 1 and 8.

As an alternative, Litvak discloses exposing the wafer surface to a broad spectrum light source, such as white light, and charting the results as signal vs. wavelength, rather than signal vs. time. (Litvak, col. 12, lines 61-67 and col. 13, lines 1-

6). However, in this case, the maximum and minimum of a particular wavelength cannot be detected, since each wavelength is displayed as a single point on the graph and hence forms no maximum or minimum for a particular wavelength, as required by independent claims 1 and 8.

The Chao reference discloses measuring light emission from a plasma, and detecting an endpoint when the measured light intensity falls within a prescribed level in relationship to the maximum intensity observed during the main etch step. (Chao, col. 5, lines 4-12). During etch, the light emission intensity from the plasma increases when the etch is initiated, stays at a relatively constant level during etch, and falls during breakthrough. (Chao, col. 4, lines 44-49). Hence, the Chao reference detects an endpoint when the light intensity falls to a predefined level, indicating breakthrough. However, the Chao reference does not disclose or reasonably suggest detecting the reflected maximum of a first signal and the reflected maximum of a second signal and using the combination of the two signals to determine the endpoint, as required by independent claims 1 and 8. Hence, neither the Litvak reference nor the Chao reference disclosed the particular combinations as required in independent claims 1 and 8.

Accordingly, independent claims 1 and 8 are submitted to be patentable under 35 U.S.C. § 103(a) over the Litvak patent in view of the Chao patent. Claims 2-7 and 9-15, each of which ultimately depends from independent claims 1 and 8 respectively, are likewise submitted to be patentable under U.S.C. § 103(a) over the Litvak patent in view of the Chao patent for at least the same reasons set forth above regarding independent claims 1 and 8.

In view of the foregoing, Applicants respectfully request reconsideration and reexamination of claims 1-15, and submit that these claims are in condition for allowance. Accordingly, a notice of allowance is respectfully requested. In the event a telephone conversation would expedite the prosecution of this application, the Examiner may reach the undersigned at **(408) 749-6900 x6920**. If any fees are due in connection with the filing of this paper, then the Commissioner is authorized to charge such fees to Deposit Account No. 50-0805 (Order No. LAM2P282). A copy of the transmittal is enclosed for this purpose.

Respectfully submitted,
MARTINE & PENILLA, LLP

Joe A. Brock, II
Registration No. 46,021

710 Lakeway Drive, Suite 170
Sunnyvale, California 94085
Telephone: (408) 749-6900
Customer Number 25,920

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the application of	Docket No. LAM2P282
Ni et al.	Group Art Unit: 1765
Application No. 09/586,530	Examiner: V. Perez-Ramos
Filed: May 31, 2000	Date: September 12, 2002
For: ETCH ENDPOINT DETECTION	

MARKED UP CLAIMS

1. (Twice Amended) A method for determining an endpoint for etching a layer, comprising [steps of]:

[estimating] selecting an etch endpoint; and, during etch,

directing radiant energy at two or more wavelengths onto [the] a layer to be etched;[,]

detecting a last intensity maximum reflected at a first wavelength prior to the [estimated] selected etch endpoint;[,] and

detecting an intensity maximum reflected at a second wavelength first occurring after the last intensity maximum at the first wavelength.

8. (Twice Amended) A method for determining an endpoint for etching a layer having an [approximate] initial thickness, comprising steps of, during etch,

directing radiant energy at three or more wavelengths onto the layer to be etched;

selecting first, second, and third wavelengths;

[approximating] selecting an etch rate from a time interval between a first detected intensity minimum and an adjacent intensity maximum reflected at the third wavelength, and [estimating] selecting an etch endpoint [from] based on the [approximate] initial thickness of the layer and the [approximate] selected etch rate;

detecting a last intensity maximum reflected at the first wavelength prior to the [estimated] selected etch endpoint; and

detecting an intensity maximum reflected at the second wavelength first occurring after the last intensity maximum at the first wavelength.